

We claim:

1. A method of signal transmission comprising the steps of:

splitting a signal s_1 into signals $s_1(a)$ and $s_1(b)$, wherein signal s_1 comprises a first STS/OTD signal belonging to an STS/OTD pair;

splitting a signal s_2 into signals $s_2(a)$ and $s_2(b)$, wherein signal s_2 comprises a second STS/OTD signal belonging to the STS/OTD pair;

phase sweeping the signal $s_1(b)$ using a first phase sweep frequency signal to produce a phase swept signal $s_1(b)$;

phase sweeping the signal $s_2(b)$ using a second phase sweep frequency signal to produce a phase swept signal $s_2(b)$, the first and second phase sweep frequency signals being configured to cancel out any self induced interference caused by phase sweeping the signals $s_1(b)$ and $s_2(b)$;

adding the phase swept signal $s_2(b)$ to the signal $s_1(a)$ to produce a summed signal s_3 ; and

adding the phase swept signal $s_1(b)$ to the signal $s_2(a)$ to produce a summed signal s_4 .

2. The method of claim 1, wherein the first and second phase sweep frequency signals utilize a same phase sweep frequency with the second phase sweep frequency signal rotating in the opposite direction plus an offset of π relative to the first phase sweep frequency signal.

3. The method of claim 1, wherein the first and second phase sweep frequency signals utilize a same phase sweep frequency with the first phase sweep frequency signal rotating in the opposite direction plus an offset of π relative to the second phase sweep frequency signal.

4. The method of claim 1 comprising the additional steps of:

amplifying the summed signal s_3 to produce an amplified summed signal s_3 ; and

amplifying the summed signal s_4 to produce an amplified summed signal s_4 .

5. The method of claim 1 comprising the additional steps of:

transmitting the summed signal s_3 over a first antenna belonging to a pair of diversity antennas; and

4 transmitting the summed signal s_4 over a second antenna belonging to the pair of
5 diversity antennas.

1 6. The method of claim 1 comprising the additional steps of:

1 prior to the step of adding the phase swept signal $s_2(b)$ to the signal $s_1(a)$, phase
2 sweeping the signal $s_1(a)$ using a third phase sweep frequency signal to produce a phase
3 swept signal $s_1(a)$ with a different phase from the phase swept signal $s_2(b)$; and
4 prior to the step of adding the phase swept signal $s_1(b)$ to the signal $s_2(a)$, phase
5 sweeping the signal $s_2(a)$ using a fourth phase sweep frequency signal to produce a phase
6 swept signal $s_2(a)$ with a different phase from the phase swept signal $s_1(b)$.

1 7. A method of signal transmission comprising the steps of:

2 splitting a signal s_1 into signals $s_1(a)$ and $s_1(b)$, wherein signal s_1 comprises a first
3 STS/OTD signal belonging to an STS/OTD pair;

4 splitting a signal s_2 into signals $s_2(a)$ and $s_2(b)$, wherein signal s_2 comprises a
5 second STS/OTD signal belonging to the STS/OTD pair;

6 phase sweeping the signal $s_1(a)$ using a first phase sweep frequency signal to
7 produce a phase swept signal $s_1(a)$;

8 phase sweeping the signal $s_2(a)$ using a second phase sweep frequency signal to
9 produce a phase swept signal $s_2(a)$, the first and second phase sweep frequency signals
10 being configured to cancel out any self induced interference caused by phase sweeping
11 the signals $s_1(a)$ and $s_2(a)$;

12 adding the phase swept signal $s_2(a)$ to the signal $s_1(b)$ to produce a summed
13 signal s_3 ; and

14 adding the phase swept signal $s_1(a)$ to the signal $s_2(b)$ to produce a summed
15 signal s_4 .

1 8. The method of claim 7, wherein the first and second phase sweep frequency signals
2 utilize a same phase sweep frequency with the second phase sweep frequency signal
3 rotating in the opposite direction plus an offset of π relative to the first phase sweep
4 frequency signal.

1 9. The method of claim 7, wherein the first and second phase sweep frequency signals
2 utilize a same phase sweep frequency with the first phase sweep frequency signal rotating

in the opposite direction plus an offset of π relative to the second phase sweep frequency signal.

10. The method of claim 7 comprising the additional steps of:

amplifying the summed signal s_3 to produce an amplified summed signal s_3 ; and
amplifying the summed signal s_4 to produce an amplified summed signal s_4 .

11. The method of claim 7 comprising the additional steps of:

transmitting the summed signal s_3 over a first antenna belonging to a pair of
diversity antennas; and
transmitting the summed signal s_4 over a second antenna belonging to the pair of
diversity antennas.

12. The method of claim 7 comprising the additional steps of:

prior to the step of adding the phase swept signal $s_2(a)$ to the signal $s_1(b)$, phase
sweeping the signal $s_1(b)$ using a third phase sweep frequency signal to produce a phase
swept signal $s_1(b)$ with a different phase from the phase swept signal $s_2(a)$; and
prior to the step of adding the phase swept signal $s_1(a)$ to the signal $s_2(b)$, phase
sweeping the signal $s_2(b)$ using a fourth phase sweep frequency signal to produce a phase
swept signal $s_2(b)$ with a different phase from the phase swept signal $s_1(a)$.

13. A base station comprising:

a first splitter for splitting a signal s_1 into signals $s_1(a)$ and $s_1(b)$, wherein signal s_1
comprises a first STS/OTD signal belonging to an STS/OTD pair;
a second splitter for splitting a signal s_2 into signals $s_2(a)$ and $s_2(b)$, wherein
signal s_2 comprises a second STS/OTD signal belonging to the STS/OTD pair;
a first multiplier for phase sweeping the signal $s_1(b)$ using a first phase sweep
frequency signal to produce a phase swept signal $s_1(b)$;
a second multiplier for phase sweeping the signal $s_2(b)$ using a second phase
sweep frequency signal to produce a phase swept signal $s_2(b)$, the first and second phase
sweep frequency signals being configured to cancel out any self induced interference
caused by phase sweeping the signals $s_1(b)$ and $s_2(b)$;
a first adder for adding the phase swept signal $s_2(b)$ to the signal $s_1(a)$ to produce
a summed signal s_3 ; and

14 a second adder for adding the phase swept signal $s_1(b)$ to the signal $s_2(a)$ to
15 produce a summed signal s_4 .

1 14. The base station of claim 13, wherein the first and second phase sweep frequency signals
2 utilize a same phase sweep frequency with the second phase sweep frequency signal
3 rotating in the opposite direction plus an offset of π relative to the first phase sweep
4 frequency signal.

1 15. The base station of claim 13, wherein the first and second phase sweep frequency signals
2 utilize a same phase sweep frequency with the first phase sweep frequency signal rotating
3 in the opposite direction plus an offset of π relative to the second phase sweep frequency
4 signal.

1 16. The base station of claim 13 further comprising:
2 a first amplifier for amplifying the summed signal s_3 to produce an amplified
3 summed signal s_3 ; and
4 a second amplifier for amplifying the summed signal s_4 to produce an amplified
5 summed signal s_4 .

1 17. The base station of claim 13 further comprising:
2 a pair of diversity antennas having a first and a second antenna;
3 a first transmitter for transmitting the summed signal s_3 over the first antenna;
4 and
5 a second transmitter for transmitting the summed signal s_4 over the second
6 antenna.

1 18. The base station of claim 13 further comprising:
1 a third multiplier for phase sweeping the signal $s_1(a)$ using a third phase sweep
2 frequency signal to produce a phase swept signal $s_1(a)$ with a different phase from the
3 phase swept signal $s_2(b)$ prior to adding the phase swept signal $s_2(b)$ to the signal $s_1(a)$;
4 and
5 a fourth multiplier for phase sweeping the signal $s_2(a)$ using a fourth phase sweep
6 frequency signal to produce a phase swept signal $s_2(a)$ with a different phase from the
7 phase swept signal $s_1(b)$ prior to adding the phase swept signal $s_1(b)$ to the signal $s_2(a)$.

19. A base station comprising:

a first splitter for splitting a signal s_1 into signals $s_1(a)$ and $s_1(b)$, wherein signal s_1 comprises a first STS/OTD signal belonging to an STS/OTD pair;

a second splitter for splitting a signal s_2 into signals $s_2(a)$ and $s_2(b)$, wherein signal s_2 comprises a second STS/OTD signal belonging to the STS/OTD pair;

a first multiplier for phase sweeping the signal $s_1(a)$ using a first phase sweep frequency signal to produce a phase swept signal $s_1(a)$;

a second multiplier for phase sweeping the signal $s_2(a)$ using a second phase sweep frequency signal to produce a phase swept signal $s_2(a)$, the first and second phase sweep frequency signals being configured to cancel out any self induced interference caused by phase sweeping the signals $s_1(a)$ and $s_2(a)$;

a first adder for adding the phase swept signal $s_2(a)$ to the signal $s_1(b)$ to produce a summed signal s_3 ; and

a second adder for adding the phase swept signal $s_1(a)$ to the signal $s_2(b)$ to produce a summed signal s_4 .

20. The base station of claim 19, wherein the first and second phase sweep frequency signals utilize a same phase sweep frequency with the second phase sweep frequency signal rotating in the opposite direction plus an offset of π relative to the first phase sweep frequency signal.

21. The base station of claim 19, wherein the first and second phase sweep frequency signals utilize a same phase sweep frequency with the first phase sweep frequency signal rotating in the opposite direction plus an offset of π relative to the second phase sweep frequency signal.

22. The base station of claim 19 further comprising:

a first amplifier for amplifying the summed signal s_3 to produce an amplified summed signal s_3 ; and

a second amplifier for amplifying the summed signal s_4 to produce an amplified summed signal s_4 .

23. The base station of claim 19 further comprising:

a pair of diversity antennas having a first and a second antenna;

3 a first transmitter for transmitting the summed signal s_3 over the first antenna;
4 and
5 a second transmitter for transmitting the summed signal s_4 over the second
6 antenna.

1 24. The base station of claim 19 further comprising:

1 a third multiplier for phase sweeping the signal $s_1(b)$ using a third phase sweep
2 frequency signal to produce a phase swept signal $s_1(b)$ with a different phase from the
3 phase swept signal $s_2(a)$ prior to adding the phase swept signal $s_2(a)$ to the signal $s_1(b)$;
4 and

5 a fourth multiplier for phase sweeping the signal $s_2(b)$ using a fourth phase sweep
6 frequency signal to produce a phase swept signal $s_2(b)$ with a different phase from the
7 phase swept signal $s_1(a)$ prior to adding the phase swept signal $s_1(a)$ to the signal $s_2(b)$.